PROPOSED ACTION:	Issuance of an Incidental Harassment Authorization to the Alaska Department of Transportation & Public Facilities to Take Marine Mammals by Harassment Incidental to the Gustavus Ferry Terminal Improvements Project
TYPE OF STATEMENT:	Environmental Assessment
LEAD AGENCY:	U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service
RESPONSIBLE OFFICIAL:	Donna S. Wieting, Director, Office of Protected Resources, National Marine Fisheries Service
FOR FURTHER INFORMATION:	Rob Pauline National Marine Fisheries Service Office of Protected Resources Permits and Conservation Division 1315 East West Highway Silver Spring, MD 20910 301-427-8401
LOCATION:	Gustavus, Alaska
ABSTRACT:	This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources proposals to issue an Incidental Harassment Authorization (IHA) to the Alaska Department of Transportation & Public Facilities, by Level A and Level B harassment of small numbers of marine mammals incidental to improvements at the Gustavus Ferry Terminal in Gustavus, Alaska. The IHA would be valid from December 15, 2017 through December 14, 2018.
DATE:	December 2016

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LIST OF ACRONYMS AND ABBREVIATIONS

µPa	microPascal
ADOT&PF	Alaska Department of Transportation & Public Facilities
Authorization	Incidental Harassment Authorization
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB	decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
FR	Federal Register
Km	kilometer
m	meter
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OPR	Office of Protected Resources
OMB	Office of Management and Budget
rms	root-mean-square
ACOE	US Army Corp of Engineers
USFWS	US Fish and Wildlife Service

Chapter 1 Introduction and Purpose and Need

1.1. Background

The Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.) prohibits the incidental taking of marine mammals. The incidental take of a marine mammal falls under three categories: mortality, serious injury or harassment (i.e., injury and behavioral effects). Harassment[1] is any act of pursuit, torment or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns (Level B harassment). Disruption of behavioral patterns includes, but is not limited to, migration, breathing, nursing, breeding, feeding or sheltering. However, there are exceptions to the prohibition on take in Section 101(a)(5)(D) of the MMPA that gives the National Marine Fisheries Service (NMFS) the authority to authorize the incidental but not intentional take of small numbers of marine mammals by harassment, provided certain determinations are made and statutory and regulatory procedures are met.

NMFS also promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals, 50 Code of Federal Regulations (CFR) Part 216 and produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA.

1.1.1. Applicant's Incidental Take Authorization Request

The Alaska Department of Transportation & Public Facilities (ADOT&PF) requested an Incidental Harassment Authorization (IHA) to take marine mammals by harassment incidental to construction activities associated with the Gustavus Ferry Terminal Improvements Project located on Icy Passage, Gustavus, in Southeast Alaska.

ADOT&PF proposes to make improvements to the Ferry Terminal. ADOT&PF's application (ADOT&PF 2016) presents more detailed information on the proposed project. These improvements include in-water pile driving and removal and are the subject of this IHA request. Acoustic stimuli generated by impact pile driving and vibratory pile driving and removal have the potential to cause marine mammals to experience short-term behavioral disturbance in the proposed area.

1.1.2. Marine Mammals in the Proposed Action Area

There are seven marine mammal species with confirmed or potential occurrence in the proposed action area. These species would most likely be harassed incidental to ADOT&PF conducting the proposed activities:

- harbor seal (*Phoca vitulina*)
- Steller sea lion (*Eumetopias jubatus*)
- Harbor porpoise (*Phocoena phocoena*)
- Dall's porpoise (*Phocoenoides dalli*)
- Killer whale (*Orcinus orca*)

[1] As defined in the MMPA for non-military readiness activities (Section 3 (18)(A)).

- Humpback whale (*Megaptera novaeangliae*)
- Minke whale (*Balaenoptera acutorostrata*)

1.2. Purpose and Need

1.2.1. Description of the Proposed Action

NMFS proposes to issue an IHA to ADOT&PF pursuant to Section 101(a)(5)(A) of the MMPA and 50 CFR Part 216. The IHA will be valid from December 15, 2017 through December 14, 2018 and authorizes takes, by Level A and Level B harassment, of marine mammals incidental to improvements made to the Gustavus Ferry Terminal. NMFS' proposed action is a direct outcome of ADOT&PF requesting an IHA to take marine mammals.

1.2.2. Purpose

The purpose of our proposed action is to authorize take of marine mammals incidental to ADOT&PF's proposed Gustavus Ferry Terminal Improvements Project. As noted in section 1.1.1 the acoustic stimuli occurring during pile driving and removal activities has the potential to cause marine mammals near the construction site to be behaviorally disturbed and thus warrant an IHA from NMFS.

The IHA, if issued, would provide an exception to ADOT&PF from the take prohibitions contained in the MMPA. To authorize the incidental take of small numbers of marine mammals, NMFS must evaluate the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and whether the activity would have an unmitigable impact on the availability of affected marine mammal species for subsistence use. NMFS cannot issue this IHA if it would result in more than a negligible impact on marine mammals or stocks or would result in an unmitigable impact on subsistence uses. In addition, we must prescribe the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, we must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. IHAs must also include requirements or conditions pertaining to the monitoring and reporting of takings, in large part to better understand the effects of such taking on the species.

1.2.3. Need

U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS jurisdiction must submit such a request (in the form of an application) to NMFS. On April 15, 2016, ADOT&PF submitted an adequate and complete application demonstrating the need and potential eligibility for an IHA under the MMPA. Therefore, NMFS has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described in the ADOT&PF application. NMFS' responsibilities under section 101(a)(5)(A) of the MMPA and its implementing regulations establish and frame the need for NMFS proposed action.

1.3. The Environmental Review Process

In accordance with the Council on Environmental Quality (CEQ) Regulations and agency policies for implementing the National Environmental Policy Act (NEPA), NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within National Oceanic Atmospheric Administration (NOAA) (e.g., the Office of the National Marine Sanctuaries) and with other regulatory agencies (*e.g.*, the U.S. Fish and Wildlife Service), as appropriate, during NEPA reviews prior to implementation of a proposed action to ensure that requirements are met. Regarding the issuance of IHAs, we rely substantially on the public process required by the MMPA for preparing proposed IHAs to develop and evaluate relevant environmental information and provide a meaningful opportunity for public participation when we prepare corresponding NEPA documents. We fully consider public comments received in response to the publication of proposed IHAs during the corresponding NEPA review process.

1.3.1. The National Environmental Policy Act

NEPA requires federal agencies to examine the environmental impacts of their proposed actions within the United States and its territories. A NEPA analysis is a public document that provides an assessment of the potential effects a major federal action may have on the human environment, which includes the natural and physical environment. Major federal actions include activities that federal agencies fully or partially finance, assist, regulate, conduct or approve. NMFS' issuance of IHAs allows for the taking of marine mammals, albeit consistent with provisions under the MMPA and incidental to the applicant's activities, and is considered a major federal action. Therefore, NMFS analyzes the environmental effects associated with authorizing incidental takes of protected species and prepares the appropriate NEPA documentation.

1.3.2. Scoping and Public Involvement

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences and take actions to protect, restore, and enhance the environment. An integral part of the NEPA process is public involvement. Early public involvement facilitates the development of an environmental assessment (EA) and informs the scope of issues to be addressed in the EA. Although agency procedures do not require public involvement prior to finalizing an EA, NMFS determined the publication of the proposed IHA and EA was the appropriate step to involve the public to understand the public concerns for the proposed action, identify significant issues related to the proposed action and obtain the necessary information to complete an analysis. The notice of the proposed IHA and the corresponding public comment period are instrumental in providing the public with information on relevant environmental issues and offering the public a meaningful opportunity to provide comments for our consideration in both the MMPA and NEPA decision-making processes. The public was given the opportunity to submit comments during a 30-day comment period that began the date that the notice of the proposed IHA was published in the *Federal Register* (June 23, 2016; 81 FR 40852). Relevant comments received during the comment period are discussed in Section 1.6.

1.4. Other Environmental Laws or Consultations

NMFS must comply with all applicable federal environmental laws, regulations, and Executive Orders (EO) necessary to implement a proposed action. NMFS' evaluation of and compliance with environmental laws, regulations and EOs is based on the nature and location of the applicant's proposed activities and NMFS' proposed action. Therefore, this section only summarizes environmental laws and consultations applicable to NMFS' issuance of an IHA to ADOT&PF. There are no other environmental laws, regulations, EOs, consultations, federal permits or licenses applicable to NMFS' issuance of an IHA to ADOT&PF.

1.4.1. **The Endangered Species Act**

The Endangered Species Act (ESA) established protection over and conservation of threatened and endangered species (T&E) and the ecosystems upon which they depend. An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The U.S. Fish and Wildlife Service (USFWS) and NMFS jointly administer the ESA and are responsible for the listing of species (designating a species as either threatened or endangered) and designating geographic areas as critical habitat for T&E species. The ESA generally prohibits the "take" of an endangered species unless an exception or exemption applies. The term "take" as defined in section 3 of the ESA means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 7(a)(2) requires each federal agency to ensure that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action may affect a listed species, that agency is required to consult with NMFS and/or the USFWS under procedures set out in 50 CFR Part 402. NMFS and USFWS can also be action agencies under section 7. Informal consultation is sufficient for species the action agency determines are not likely to be adversely affected if NMFS or USFWS concurs with the action agency's findings, including any additional measures mutually agreed upon as necessary and sufficient to avoid adverse impacts to listed species and/or designated critical habitat.

NMFS' issuance of an IHA is a federal action that is also subject to the requirements of section 7 of the ESA. As a result, we are required to ensure that the issuance of an IHA to ADOT&PF is not likely to jeopardize the continued existence of any T&E species or result in the destruction or adverse modification of critical habitat for these species. There are two marine mammal species under NMFS' jurisdiction listed as endangered under the ESA with confirmed or possible occurrence in the proposed project area (humpback whale and Steller sea lion). NMFS' Office of Protected Resources (OPR) initiated consultation with NMFS' Alaska Region on this proposed project pursuant to section 7 of the ESA on May 8, 2016. A biological opinion has been issued by NMFS' Alaska Regional OPR Office. In addition, ADOT&PF, in cooperation with the Federal Highway Administration (FHWA), prepared a biological assessment (BA) to aid in assessing the potential effects of proposed ferry improvements on fish and wildlife species listed as threatened or endangered under the ESA.

1.4.2. **Magnuson-Stevens Fishery Conservation and Management Act**

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSFCMA.

The action area near Gustavus is within designated EFH for chum, pink, coho, sockeye and chinook salmon species. The proposed action may result in temporarily impaired water quality conditions and temporarily elevated noise levels within the action area during pile installation activities. The project will also result in a small amount of direct impacts to benthic and aquatic habitat at the site associated with pile footprints and new overwater structure. Pile installation activities could disturb sediments and temporarily increase turbidity within waterbodies that represent EFH for select salmon species.

Construction activities in the form of increased noise by pile driving have the potential for short-term effects on EFH for Alaska salmon, particularly habitats used by juvenile salmonids. EFH-managed salmonids may temporarily avoid designated EFH within injury exceedance thresholds during pile-driving activities. No long-term effects on EFH will occur and after pile driving is completed, ecological functions and habitat use will return to pre-construction levels.

Pile driving could cause temporary and localized impacts to the water quality of EFH in the vicinity of active work. The slight increase in turbidity that could occur during these work activities would take place in a limited mixing zone within the construction area. Conservation measures will be implemented to reduce the area of increased turbidity and introduction of construction-related debris into the water. Localized turbidity plumes are expected to dissipate relatively rapidly by tidal mixing present in the area.

Based on these data, it is unlikely that the short-term and localized elevated turbidities generated by the proposed action would directly affect EFH for juvenile or adult salmonids. Permanent loss of intertidal/subtidal foraging habitat will result from new pile installation, but the vertical structure of the piles will provide a new hard substrate for attachment of epibiota that may provide prey for EFH species.

In accordance with the EFH requirements of the MSFCMA, NMFS notified the Alaska regional office about this activity, and EFH consultation was not considered necessary for issuance of this IHA. Authorizing the take of marine mammals through the issuance of this IHA is unlikely to affect the ability of the water column or substrate to provide necessary spawning, feeding, breeding or growth to maturity functions for managed fish. Likewise, authorizing the take of marine mammals is not likely to directly or indirectly reduce the quantity or quality of EFH by affecting the physical, biological or chemical parameters of EFH. Marine mammals have not been identified as a prey component of EFH for managed fish species, so authorizing the incidental take of marine mammals probably will not reduce the quantity and/or quality of EFH.

1.5. Document Scope

This EA was prepared in accordance with NEPA (42 USC 4321, et seq.) and CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508). The analysis in this EA addresses potential impacts to the human environment and natural resources, specifically marine

mammals and their habitat, resulting from NMFS' proposed action to authorize incidental takes associated with the ADOT&PF proposed Ferry Terminal Improvements Project. We analyze direct, indirect, and cumulative impacts related to authorizing incidental take of marine mammals under the MMPA. The scope of our analysis is limited to the decision for which we are responsible (i.e. whether or not to issue the IHA). This EA is intended to provide focused information on the primary issues and impacts of environmental concern, which is our issuance of the IHA authorizing the take of marine mammals incidental to ADOT&PF's activities, and the mitigation and monitoring measures to minimize the effects of that take. For these reasons, this EA does not provide a detailed evaluation of the effects to the elements of the human environment listed in Table 1 below.

1.5.1. Other Factors Influencing the Scope of the Analysis

We have based the scope of the proposed action and nature of the alternatives considered in this EA on the relevant requirements in section 101(a)(5)(D) of the MMPA. Thus, our authority under the MMPA bounds the scope of our alternatives. We conclude that this analysis – when combined with the analyses in the following documents – fully describes the impacts associated with the proposed project with mitigation and monitoring for marine mammals. After conducting an independent review of the information and analyses for sufficiency and adequacy, we incorporate by reference the relevant analyses on ADOT&PF's proposed action as well as a discussion of the affected environment and environmental consequences within the following documents per 40 CFR 1502.21:

- Request for an Incidental Harassment Authorization Gustavus Ferry Terminal Improvements Gustavus, Alaska (Revised April 15, 2016)
- *Federal Register* notice of the proposed Authorization (June 23, 2016; 81 FR 40852)
- Biological Assessment: Gustavus Ferry Terminal Improvements, Gustavus, Alaska. Prepared for the Federal Highway Adminstration Alaska Division and Alaska Department of Transportation and Public Facilities. Hart-Crowser. June 17, 2015.

Table 1. Components of the human environment not affected by our issuance of an Authorization

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans	Geography	Military Activities
Non-Indigenous Species	Land Use	Oil and Gas Activities
Seabirds	Oceanography	Recreational Fishing
	State Marine Protected Areas	Shipping and Boating
	Federal Marine Protected Areas	National Historic Preservation Sites
	National Estuarine Research Reserves	National Trails and Nationwide Inventory of Rivers
	National Marine Sanctuaries	Low Income Populations
	Park Land	Minority Populations
	Prime Farmlands	Indigenous Cultural Resources
	Wetlands	Public Health and Safety
	Wild and Scenic Rivers	Historic and Cultural Resources
	Ecologically Critical Areas	

1.6. New Technical Guidance

In August 2016, NMFS released its *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing*, which established new thresholds for predicting auditory injury, which equates to Level A harassment under the MMPA. In the August 4, 2016, Federal Register Notice announcing the Guidance (81 FR 51694), NMFS explained the approach it would take during a transition period, wherein we balance the need to consider this new best available science with the fact that some applicants have already committed time and resources to the development of acoustic analyses based on our previous thresholds and have constraints that preclude the recalculation of take estimates, as well as consideration of where the agency is in the decision-making pipeline. In that Notice, we included a non-exhaustive list of factors that would inform the most appropriate approach for considering the new guidance, including: how far in the MMPA process the applicant has progressed; the scope of the effects; when the authorization is needed; the cost and complexity of the analysis; and the degree to which the Guidance is expected to affect our analysis. NMFS felt it was reasonable to apply the standards put forth in the new Guidance to this action. These standards resulted in NMFS authorizing Level A take for limited numbers of three species. Note that Level A take had not been included in the Draft EA, since the Guidance had not been published at that time. Additional information pertaining to the revised shutdown zones, as well as Level A and Level B take numbers stemming from the new Guidance are described in section 4.1.3 Estimated Take of Marine Mammals by Level A and Level B Incidental Harassment.

1.7. Relevant Comments on NMFS' *Federal Register* Notice

NMFS received one comment letter, from the Marine Mammal Commission (Commission). The Commission recommended that NMFS use a sound source level (SSL) higher than that proposed by ADOT&PF, which was 154.3 dB re 1 µPa at 10 m recorded at Kake Harbor, Alaska. This value was used to derive disturbance zone isopleths during vibratory driving of 30- inch steel piles for implementation at Gustavus. The Commission was concerned that this value was considerably lower than other SSLs associated with driving piles of similar type and size. ADOT&PF had implemented sound source verification (SSV) measurements at Kake Harbor, Alaska and proposed to use this information as a proxy SSL for the Gustavus Ferry Terminal project. After discussion with NMFS, the recorded value of 154.3 dB re 1 µPa at 10 m was further modified to 157.7 dB re 1 µPa. This occurred after the original findings were re-analyzed to include additional data from a single restraint pile that had not been included in the initial measurement. NMFS agrees that the original SSL measured at Kake Harbor is lower than others that have been documented at several California locations. However, NMFS felt that the substrate at Gustavus is similar to Kake Harbor as they are both composed of relatively fine-grained sediments. NMFS will also require ADOT&PF to conduct SSV testing as a monitoring requirement. If the recorded SSLs at Gustavus are greater than those measured at Kake Harbor, ADOT&PF will increase the isopleths as appropriate to meet MMPA requirements.

The Commission also recommended that NMFS ensure that the estimated numbers of takes are adequate if the amended Level B harassment zone calculated from a source greater than 157.7 dB re 1 µPa extends

into Icy Strait. However, NMFS used a SSL of 157.7 dB re 1 µPa to calculate the Level B harassment isopleth, which does not extend into Icy Strait. If the Level B harassment zone needs to be increased after ADOT&PF conducts on-site SSV verification testing NMFS will re-evaluate numbers of estimated takes as appropriate.

Chapter 2 Alternatives

2.1. Introduction

The NEPA and the implementing CEQ regulations (40 CFR §1500-1508) require consideration of alternatives to proposed major federal actions and the CEQ regulations provide guidance on the consideration of alternatives to our proposed action. An EA must consider all reasonable alternatives, including the preferred action. It must also consider the no action alternative, even if it does not meet the stated purpose and need, so as to provide a baseline analysis against which we can compare the action alternative.

To warrant detailed evaluation as a reasonable alternative, an alternative must meet our purpose and need. In this case, and as we previously explained, an alternative meets the purpose and need if it satisfies the requirements under section 101(a)(5)(D) the MMPA (see Chapter 1), which serves as the alternative's only screening criterion. We evaluated each potential alternative against this criterion. Based on this evaluation, we have identified one action alternative as reasonable and, along with the No Action Alternative, have carried two alternatives forward for evaluation in this EA.[2]

The Preferred Alternative includes a suite of mitigation measures intended to minimize any potential adverse effects to marine mammals. This chapter describes the alternatives and compares them in terms of their environmental impacts and their achievement of objectives.

2.2. Description of ADOT&PF's Proposed Activities

We present a general overview of ADOT&PF's activities associated with the Ferry Terminal Improvements Project in the June 23, 2016 *Federal Register* (81 FR 40852) notice of the proposed Authorization. We incorporate those descriptions by reference in this EA and briefly summarize them here.

2.2.1. Specified Time and Specified Area

ADOT&PF's proposed construction activities would occur between December 15, 2017 and December 14, 2018. Project activities are proposed to occur during the following two time periods. The first period is scheduled for Spring 2018, with pile driving/removal and in-water work occurring during the period of March through May. The second period will occur in Fall of 2018, with pile driving/removal and in-water work occurring during the period of September through November.

[2] For instances involving federal decisions on proposals for projects, the single action alternative would consider the effects of permitting the proposed activity which would be compared to the "No action" alternative. In this case, under the No Action Alternative, the proposed activity (*i.e.*, issuing the Authorization with mitigation, monitoring, and reporting requirements) would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity.

The use of impact driving will be limited to an estimated maximum of 57 hours over the course of 16 to 50 days of construction. Total vibratory pile driving time is estimated at 114 hours over the same period.

If ADOT&PF requests subsequent Authorizations for the same activities analyzed in this EA, we may issue an Authorization for the same activities effective for the period of one year from the date of issuance of the next Authorization.

The proposed activities will occur at the Gustavus Ferry Terminal located in Gustavus, Alaska on the Icy Passage water body in Southeast Alaska (See Figures 1 and 2 in the Application).

2.2.2. Pile Driving Conducted for Ferry Terminal Improvements

ADOT&PF's proposed project will improve the vehicle transfer span and dock at the Terminal such that damage during heavy storms is prevented, and will also improve the safety of vehicle and pedestrian transfer operations. ADOT&PF will remove the existing steel bridge float and restraint structure and replace it with two steel/concrete bridge lift towers capable of elevating the relocated steel transfer bridge above the water when not in use. Each tower would be supported by four 30-inch steel piles. The project would also expand the dock by approximately 4,100 square feet, requiring 34 new 24-inch steel piles; construct new steel six-pile (24-inch) bridge abutment; relocate the steel transfer bridge, vehicle apron, and aluminum pedestrian gangway; extract 16 steel piles; relocate the log float to the end of the existing float structure (install three 12.75-inch steel piles); install a new harbor access float (assembled from a portion the existing bridge float) and a steel six-pile (30-inch) float restraint structure; and provide access gangways and landing platforms for lift towers and an access catwalk to the existing breasting dolphins. Contractors on previous ADOT&PF dock projects have typically driven piles using the following equipment:

- Air Impact Hammers: Vulcan 512/Max Energy 60,000 foot-pounds (ft-lbs); Vulcan 06/Max Energy 19,000 ft-lbs; ICE/Max Energy 19,500 to 60,000 ft-lbs.
- Diesel Impact Hammer: Delmag D30/Max Energy 75,970 ft-lbs.
- Vibratory Hammers: ICE various models/7,930 to 13,000 pounds static weight. Similar equipment may be used for the proposed project, though each contractor's equipment may vary.

ADOT&PF anticipates driving 1 to 3 piles per day, which accounts for setting the pile in place, positioning the barge while working around existing dock and vessel traffic, splicing sections of pile, and driving the piles. Actual pile driving/removal time for nineteen 12.75-inch-, forty 24-inch-, and fourteen 30-inch-diameter steel piles would be approximately 3 hours per pile for a total of about 114 hours over the course of 16 to 50 days in 2017 and 2018 as is shown in Table 2.

Table 2 – Pile-driving Schedule for Gustavus Ferry Terminal Improvements Project

Description	Project Components							
	Dock Extension	Bridge Abutment	Lift Towers	Access Float	Log Float	Pile Removal	Piles Installed/ Total Piles	Installation/ Removal per Day
# of Piles	34	6	8	6	3	16	57/73	3 piles/day (maximum)
Pile Size (Diameter)	24-inch	24-inch	30-inch	30-inch	12.75-inch	12.75- inch	--	--
Total Strikes (Impact)	20,400	3,600	4,800	3,600	1,800	0	34,200	1,800 blows/day
Total Impact Time	34 hrs	6 hrs	8 hrs	6 hrs	3 hrs	0	57 hrs	3 hrs/day
Total Vibratory Time	54 hrs	9 hrs	13 hrs	9 hrs	5 hrs	24 hrs	114 hrs	6 hrs/day

2.3. Description of Alternatives

2.3.1. Alternative 1 – Issuance of an Authorization with Mitigation Measures

The Proposed Action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, we would issue an Authorization to ADOT&PF allowing the incidental take, by Level A and Level B harassment, of seven species of marine mammals subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the proposed Authorization, if issued.

Our *Federal Register* notice (81 FR 80542) requesting comments on the proposed Authorization analyzed the potential impacts of this Alternative in detail. We incorporate those analyses by reference in this EA and briefly summarize the mitigation and monitoring measures and reporting requirements that we would incorporate in the final Authorization, if issued, in the following sections.

Proposed Mitigation and Monitoring Measures

As described in Section 1.2.2, we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider ADOT&PF's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measures to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the measures to minimize adverse impacts as planned; and (3) the practicability of the measures for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death wherever possible;

- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);

- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);

- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);

- Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base; activities that block or limit passage to or from biologically important areas; permanent destruction of habitat; or temporary destruction/disturbance of habitat during a biologically important time; and

- For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

To reduce the potential for disturbance associated with the activities, ADOT&PF has proposed to implement several monitoring and mitigation measures for marine mammals. ADOT&PF would employ the following standard mitigation measures:

1. Conduct briefings between construction supervisors and crews, and marine mammal monitoring team, prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.
2. For in-water heavy machinery work other than pile driving (*e.g.* standard barges, tug boats, barge-mounted excavators, or clamshell equipment used to place or remove material), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include the following activities: (1) Movement of the barge to the pile location or (2) positioning of the pile on the substrate via a crane (*i.e.*, stabbing the pile).
3. To limit the amount of waterborne noise, a vibratory hammer will be used for initial driving, followed by an impact hammer to proof the pile to required load-bearing capacity.
4. For all pile driving activities, ADOT&PF will establish a shutdown zone. Shutdown zones are intended to contain the area in which SPLs equal or exceed acoustic injury criteria, based on NMFS' new acoustic technical guidance published in the *Federal Register* on August 4, 2016 (81 FR 51693). The purpose of a shutdown zone is to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area), thus preventing injury of marine mammals. The shutdown zone varies for specific species. For impact driving, the shutdown zone extends to 550 m for humpback whale and minke whale; for harbor seal, harbor porpoise and Dall's porpoise, the zone extends to 100 m; and for killer whale and Steller sea lion, the zone is set at 25 m.
5. ADOT&PF will establish Level A take zones which are areas beyond the shutdown zones where animals may be exposed to sound levels that could result in permanent threshold shift (PTS). The

Level A zone extends out to 630 m for harbor porpoise and Dall's porpoise. The Level A zone for harbor seals is set at 285 m. There are no Level A take zones applicable to other species for which take is authorized.

6. ADOT&PF will establish Level B disturbance zones or zones of influence (ZOI) which are areas where SPLs equal or exceed 160 dB rms for impact driving and 120 dB rms for vibratory driving. Disturbance zones provide utility for monitoring by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. For impact driving the Level B harassment area encompasses a radius of 2,090 m. During vibratory driving radius of the Level B harassment area extends to 3,265 m.
7. ADOT&PF will employ soft start procedures, which is believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, contractors will be required to provide an initial set of strikes from the hammer at 40 percent energy, each strike followed by no less than a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins.
8. Pile caps or cushions will be employed during impact pile driving.
9. The waters in the harassment zones will be scanned for 30 minutes before, during and 30 minutes after any and all pile driving and removal activities.
10. ADOT&PF shall establish monitoring locations as described in the Marine Mammal Monitoring Plan developed in coordination with NMFS (and incorporated here by reference). The Level A and Level B harassment areas will be monitored by qualified observers.
11. Monitoring shall be conducted by qualified observers, as described in the Monitoring Plan. ADOT&PF shall collect sighting data and behavioral responses to pile driving for marine mammal species observed in the region of activity during the period of activity. All observers shall be trained in marine mammal identification and behaviors, and shall have no other construction-related tasks while conducting monitoring.

This Alternative includes mandatory requirements for ADOT&PF to achieve the MMPA requirement of effecting the least practicable impact on each species or stock of marine mammal and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance.

Proposed Reporting Measures

ADOT&PF is required to submit a draft monitoring report to NMFS Office of Protected Resources within 90 days after the conclusion of the activities. A final report shall be prepared and submitted within 30 days following resolution of any comments on the draft report from NMFS. The final report will include:

1. a summary and table of the dates, times, and weather during all pile driving activities;
2. the species, number, location, and behavior of any marine mammals observed throughout all monitoring activities; and
3. an estimate of the number (by species) of marine mammals that are known to have been exposed to acoustic or visual stimuli associated with pile driving activities.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the proposed Authorization (if issued), such as a vessel-strike or stampede ADOT&PF and/or its designees shall immediately cease the specified activities and immediately report the incident to the Chief, Permits and Conservation Division, Office of Protected Resources. ADOT&PF and/or its designees may not resume activities until we are able to review the circumstances of the prohibited take.

We determined that the mitigation measures included in our *Federal Register* notice of issuance of an IHA were sufficient to reduce the effects of ADOT&PF's activity on marine mammals to the level of least practicable adverse impact under the MMPA. In addition, we determined that the taking of small numbers of marine mammals, incidental to ADOT&PF's proposed action would constitute no more than a negligible impact on the relevant species or stocks under the MMPA.

This Preferred Alternative would satisfy the purpose and need of our proposed action under the MMPA– issuance of an Authorization, along with required mitigation measures and monitoring. This would enable ADOT&PF to comply with the statutory and regulatory requirements of the MMPA.

2.3.2. Alternative 2 – No Action

For NMFS, denial of MMPA authorizations constitutes the NMFS No Action Alternative, which is consistent with our statutory obligation under the MMPA to grant or deny permit applications and to prescribe mitigation, monitoring and reporting with any authorizations. Under the No Action Alternative, there are two potential outcome scenarios. One is that the Terminal Improvements Project activities, including pile driving, occur in the absence of an MMPA authorization. In this case, (1) ADOT&PF would be in violation of the MMPA if takes occur and (2) mitigation, monitoring and reporting would not be prescribed by NMFS. Another outcome scenario is ADOT&PF could choose not to proceed with their proposed activities. NMFS analyzed both possible outcomes under the No Action Alternative. We took this approach to meaningfully evaluate the primary environmental issues in light of the scope of our authority to authorize take and prescribe mitigation to minimize impacts—the impact on marine mammals from these activities in the absence of protective measures.

2.4. Alternatives Considered but Eliminated from Further Consideration

NMFS considered whether other alternatives could meet the purpose and need and support ADOT&PF's proposed project. An alternative that would allow for the issuance of an Authorization with no required mitigation or monitoring was considered but eliminated from consideration, as it would not be in compliance with the MMPA and, therefore, would not meet the purpose and need. For that reason, this alternative is not analyzed further in this document.

Chapter 3 Affected Environment

NMFS reviewed all possible environmental, cultural, historical, social, and economic resources based on the geographic location associated with NMFS' proposed action, the alternatives, and ADOT&PF's request for an IHA. Based on this review, this section describes the affected environment and existing (baseline) conditions for select resource categories. As explained in Chapter 1, certain resource categories not affected by NMFS' proposed action and alternatives were not carried forward for further consideration or evaluation in this EA (See Table 1 in Section 1.5.1). Chapter 4 provides an analysis and description of environmental impacts associated with the affected environment.

3.1. Physical Environment

As discussed in Chapter 1, NMFS' proposed action and alternatives relate only to the proposed issuance of an IHA for incidental take of marine mammals and not to the physical environment. Certain aspects of the physical environment are not relevant to our proposed action (see section 1.5.1 - Scope of Environmental Analysis).

3.1.1. Marine Mammal Habitat

We present information on marine mammal habitat and the potential impacts to marine mammal habitat in the *Federal Register* (81 FR 40852) notice of the proposed Authorization. In summary, there are no rookeries or major haul-out sites nearby or ocean bottom structure of significant biological importance to marine mammals that may be present in the marine waters in the vicinity of the project area. No critical habitat exists in the area of the proposed activities. The action area is within designated EFH for Pacific salmon. Section 1.4.2 describes how the proposed action will result in no significant effects to any functional component of EFH for Pacific salmon.

3.1.2. Ambient Sound

The need to understand the marine acoustic environment is critical when assessing the effects of anthropogenic noise on marine wildlife. Sounds generated by coastal construction such as pile driving and dredging within the marine environment can affect its inhabitants' behavior (e.g., deflection from loud sounds) or ability to effectively live in the marine environment (e.g., masking of sounds that could otherwise be heard).

Ambient sound levels are the result of numerous natural and anthropogenic sounds that can propagate over large distances and vary greatly on a seasonal and spatial scale. These ambient sounds occupy all frequencies and contributions in ocean soundscape from a few hundred Hz to 200 kHz (NRC, 2003). In typical urban coastal waters such as the one at the proposed action area, the main sources of underwater ambient sound would be associated with:

- Wind and wave action
- Precipitation
- Vessel activities
- Biological sounds (e.g. fish, snapping shrimp)

The contribution of these sources to the background sound levels differs with their spectral components and local propagation characteristics (e.g., water depth, temperature, salinity, and ocean bottom conditions). In deep water, low-frequency ambient sound from 1-10 Hz mainly comprises turbulent pressure fluctuations from surface waves and the motion of water at the air-water interfaces. At these infrasonic frequencies, sound levels depend only slightly on wind speed. Between 20-300 Hz, distant anthropogenic sound (ship transiting, etc.) dominates wind-related sounds. Above 300 Hz, the ambient sound level depends on weather conditions, with wind- and wave-related effects mostly dominating sounds. Biological sounds arise from a variety of sources (e.g., marine mammals, fish, and shellfish) and range from approximately 12 Hz to over 100 kHz. The relative strength of biological sounds varies greatly; depending on the situation, biological sound can be nearly absent to dominant over narrow or even broad frequency ranges (Richardson et al. 1995).

3.2. Biological Environment

3.2.1. Marine Mammals

We provide information on the occurrence of marine mammals most likely present at the proposed action areas in section 1.1.2 of this EA. The marine mammals most likely to be harassed incidental to proposed pile driving at the Ferry Terminal are primarily harbor seal, Steller sea lion, harbor porpoise, Dall's porpoise, killer whale, humpback whale, and minke whale. The Mexico Distinct Population Segment (DPS) of humpback whale is listed as threatened and the western DPS of Steller sea lion is listed as endangered under the Endangered Species Act.

We provided information on the distribution, population size, and conservation status for each species in the *Federal Register* notice on the proposed Authorization and we incorporate those descriptions by reference here. Table 3 presents the species most likely to occur in the area

Table 3 – Marine Mammal Species Potentially Present in Region of Activity

Common Name	Scientific Name	Stock Abundance Estimate[1]	ESA Status	MMPA Status	Frequency of Occurence[2]
Harbor seal	*Phoca vitulina*	7,210	Not listed	Not Strategic, non-depleted	Likely
Steller sea lion	*Eumetopias jubatus*	49,497 (western distinct population segment in Alaska)/ 60,131 (eastern stock)	Endangered (western Distinct Population Segment)/ Not Listed (eastern Distinct Population Segment)	Strategic, depleted	Likely
Dall's porpoise	*Phocoenoides dalli*	Unknown	Not listed	Not Strategic, non-depleted	Infrequent
Harbor porpoise	*Phocoena phocoena*	11,146	Not listed	Strategic, non- depleted	Likely
Humpback whale	*Megaptera novaeangliae*	10,103 (Central North Pacific Stock)/Unknown (Mexico DPS)	Threatened (Mexico DPS)/Not Listed (Hawaii DPS)	Strategic, depleted (Mexico DPS)	Infrequent
Killer whale	*Orcinus orca*	261 (Northern resident)/587 (Gulf of Alaska transient)/243 (West Coast transient)	Not listed	Strategic, non- depleted	Infrequent
Minke whale	*Balaenoptera acutorostrata*	Unknown	Not listed	Not Strategic	Infrequent

[1] 2015 NMFS marine mammal stock assessment reports at: http://www.nmfs.noaa.gov/pr/sars/species.htm

[2] Infrequent: confirmed, but irregular sightings

Harbor Seal: Harbor seals occurring in Icy Passage belong to the Glacier Bay/Icy Strait (GB/IS) harbor seal stock. The current statewide abundance estimate for this stock is 7,210 (Muto and Angliss 2015). The GB/IS harbor seals have been rapidly declining despite stable or slightly increasing trends in nearby populations (Womble and Gende 2013). A suite of recent studies suggest that (1) harbor seals in Glacier Bay are not significantly stressed due to nutritional constraints, (2) the clinical health and disease status of seals within Glacier Bay is not different than seals from other stable or increasing populations, and (3) disturbance by vessels does not appear to be a primary factor driving the decline. Long-term monitoring of harbor seals on glacial ice has occurred in Glacier Bay since the 1970s and has shown this area to support one of the largest breeding aggregations in Alaska. After a dramatic retreat of Muir Glacier, in the East Arm of Glacier Bay, between 1973 and 1986 (more than 7 kilometers) and the subsequent grounding and cessation of calving in 1993, floating glacial ice was greatly reduced as a haulout substrate for harbor seals.

Steller Sea Lion: Steller sea lions occurring in Icy Passage could belong to either the western or eastern DPS stock. The current total population estimate for the western stock in Alaska is estimated at 49,497 based on 2014 survey results (Muto and Angliss 2015). The western stock in Alaska shows a positive population trend estimate of 1.67 percent.

The current total population estimate for the eastern stock of Steller sea lions is estimated at 60,131 based on counts made between 2009 and 2014 (Muto and Angliss 2015). The best available information indicates the eastern stock of Steller sea lion increased at a rate of 4.18 percent per year (90 percent confidence bounds of 3.71 to 4.62 percent per year) between 1979 and 2010 based on an analysis of pup counts in California, Oregon, British Columbia, and Southeast Alaska.

Dall's Porpoise: There are no reliable abundance data for the Alaska stock of Dall's porpoise. Surveys for the Alaska stock of Dall's porpoise are greater than 21 years old (Allen and Angliss 2014). A population estimate from 1987 to 1991 was 83,400. Since the abundance estimate is based on data older than 8 years, the minimum population number is considered unknown.

Harbor Porpoise: There are three harbor porpoise stocks in Alaska including the Southeast Alaska stock, Gulf of Alaska stock, and the Bering Sea stock. Only the Southeast Alaska stock occurs in the project vicinity. Harbor porpoise numbers for the Southeast Alaska stock are estimated at 11,146 animals (Allen and Angliss 2014). Abundance estimates for harbor porpoise occupying the inland waters of Southeast Alaska were 1,081 in 2012. However, this number may be biased low due to survey methodology.

Humpback Whale: The central North Pacific stock of humpback whales occurs in the project area. Estimates of this stock are determined by winter surveys in Hawaiian waters. Point estimates of abundance for Hawaii ranged from 7,469 to 10,252; the estimate from the best model was 10,103 (Muto and Angliss 2015). Using the population estimate of 10,103, the minimum estimate for the central North Pacific humpback whale stock is 7,890 (Muto and Angliss 2015). Note that the listed status of the humpback whale was recently updated after NMFS conducted a global status review. The humpback whale was listed as endangered under the Endangered Species Conservation Act (ESCA) on December 2, 1970 (35 FR 18319). Congress replaced the ESCA with the ESA in 1973, and humpback whales continued to be listed as endangered. Under the revised listing status, the Western North Pacific DPS (which includes a small proportion of humpback whales found in the Aleutian Islands, Bering Sea, and

Gulf of Alaska) are listed as endangered; the Mexico DPS (which includes a small proportion of humpback whales found in the Aleutian Islands, Bering Sea, Gulf of Alaska, and southeast Alaska) is listed as threatened, and the Hawaii DPS (which includes most humpback whales found in the Aleutian Islands, Bering Sea, Gulf of Alaska, and southeast Alaska) is not listed, effective October 11, 2016 (81 FR 66260; September 8, 2016). It is estimated that 94% of the humpback whales in Southeast Alaska are from the Hawaii DPS (94%), while 6.1% represent the Mexico DPS (6.1%) (Wade et al. 2016.)

Since 1985, the NPS has been monitoring humpback whales in both Glacier Bay National Park and Icy Strait and has published annual reports (http://www.nps.gov/glba/naturescience/whale_acoustic_reports.htm). The NPS typically surveys Icy Strait, located south of Icy Passage, once a week between June 1 and August 31, with most survey effort focused in the area east of Point Gustavus and Pleasant Island. In 2013, 202 humpback whales were documented in Icy Strait during the NPS monitoring period; this was a 14 percent increase over the previous high count of 177 whales in 2012 (Neilson *et al.* 2014). However, in 2014, a 39 percent decrease in abundance was observed with only 124 whales documented in Icy Strait. The reasons for this decline in local abundance is not known, but NPS speculated that a magnitude 6.1 earthquake centered in Palma Bay that occurred on July 25, 2014, may have caused unfavorable environmental conditions in the Glacier Bay region. The earthquake and aftershocks caused one or more submarine landslides that increased turbidity in the region and may have decreased humpback whale foraging success over a period of several weeks in lower Glacier Bay and Icy Strait. In response, humpback whales may have shifted their distribution to other areas, such as Frederick Sound, seeking better foraging conditions (Neilson *et al.* 2015).

Humpback whales are present in Southeast Alaska in all months of the year, but at substantially lower numbers in the fall and winter. At least 10 individuals were found to over-winter near Sitka, and NMFS researchers have documented one whale that over-wintered near Juneau. It is unknown how common over-wintering behavior is in most areas because there is minimal or no photographic identification effort in the winter in most parts of Southeast Alaska. Late fall and winter whale habitat in Southeast Alaska appears to correlate with areas that have over-wintering herring (lower Lynn Canal, Tenakee Inlet, Whale Bay, Ketchikan, Sitka Sound). In Glacier Bay and Icy Strait, the longest sighting interval recorded by NPS was over a span of 219 days, between April 17 and November 21, 2002, but overwintering in this region is expected to be low (Gabriele *et al.* 2015).

Killer Whale: Killer whales occurring in Icy Passage could belong to one of three different stocks: Eastern North Pacific Northern residents stock (Northern residents), Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock (Gulf of Alaska transients), or West Coast transient stock. The Northern resident stock is a transboundary stock, and includes killer whales that frequent British Columbia, Canada, and southeastern Alaska (Allen and Angliss 2014). Photo-identification studies since 1970 have catalogued every individual belonging to the Northern resident stock and in 2010 the population was composed of three clans representing a total of 261 whales.

In recent years, a small number of the Gulf of Alaska transients (identified by genetics and association) have been seen in southeastern Alaska; previously only West Coast transients had been seen in the region (Allen and Angliss 2014). Therefore, the Gulf of Alaska transient stock occupies a range that includes southeastern Alaska. Photo-identification studies have identified 587 individual whales in this stock.

The West Coast transient stock includes animals that occur in California, Oregon, Washington, British Columbia, and southeastern Alaska. Analysis of photographic data identifies 243 individual transient killer whales (Muto and Angliss 2015). The total number of transient killer whales reported above should be considered a minimum count for the West Coast transient stock.

Minke Whale: The Alaska stock of minke whales occurs in Icy Strait and Southeast Alaska. At this time, it is not possible to produce a reliable estimate of minimum abundance for this wide ranging stock. No estimates have been made for the number of minke whales in the entire North Pacific. Surveys of the Bering Sea, and from Kenai Fjords in the Gulf of Alaska to the central Aleutian Islands estimate 1,003 and 1,233 animals, respectively (Allen and Angliss 2014). However, these surveys covered only a portion of the whale's range.

3.3. Socioeconomic Environment

3.3.1. Subsistence

The proposed Gustavus Ferry Terminal Improvements project will occur near but not overlap the subsistence area used by the villages of Hoonah and Angoon (Wolfe *et al.* 2013). Harbor seals and Steller sea lions area available for subsistence harvest in this area (Wolfe *et al.* 2013). There are no harvest quotas for other non-listed marine mammals found there. The Alaska Department of Fish and Game (Wolfe *et al.* 2013) has regularly conducted surveys of harbor seal and sea lion subsistence harvest in Alaska. Since proposed work at the Gustavus Ferry Terminal will only cause temporary nonlethal disturbance of marine mammals, we anticipate no impacts to subsistence harvest of marine mammals in the region.

Chapter 4 Environmental Consequences

This chapter of the EA analyzes the impacts of the two alternatives and addresses the potential direct, indirect, and cumulative impacts of our proposed issuance of an Authorization. ADOT&PF's application, our notice of a proposed Authorization, and other related environmental analyses identified previously, facilitate an analysis of the direct, indirect, and cumulative effects of our proposed issuance of an Authorization.

Under the MMPA, we have evaluated the potential impacts of ADOT&PF's Gustavus Ferry Terminal Improvements Project in order to determine whether to authorize incidental take of marine mammals. Under NEPA, we have determined that an EA is appropriate to evaluate the potential significance of environmental impacts resulting from the issuance of our Authorization.

4.1. Effects of Alternative 1 – Issuance of an Authorization with Mitigation Measures

Under the Preferred Alternative, we would propose to issue a one-year Authorization to ADOT&PF allowing the incidental take, by Level A and Level B harassment, of seven species of marine mammals subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the Authorization, if issued. We would incorporate the mitigation and monitoring measures and reporting described earlier in this EA into a final Authorization.

4.1.1. Impacts to Marine Mammal Habitat

The proposed action (i.e., the issuance of an Authorization for the take of marine mammals) would have no additive or incremental effect on the physical environment, or on components of the biological environment that function as marine mammal habitat, beyond those resulting from ADOT&PF's proposed project. The proposed activity area is not located within a marine sanctuary or a National Park. The primary potential impacts to marine mammal habitat are associated with elevated sound levels produced by vibratory and impact pile driving and removal in the area. However, other potential impacts to the surrounding habitat from physical disturbance are also possible.

Construction activities would produce continuous (i.e., vibratory pile driving) sounds and pulsed (i.e. impact driving) sounds. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The most likely impact to fish from pile driving activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the short timeframe for the project.

Pile installation may temporarily increase turbidity resulting from suspended sediments. Any increases would be temporary, localized, and minimal. ADOT&PF must comply with state water quality standards during these operations by limiting the extent of turbidity to the immediate project area. In general, turbidity associated with pile installation is localized to about a 25-foot radius around the pile. Cetaceans are not expected to be close enough to the project pile driving areas to experience effects of turbidity, and any pinnipeds that will be transiting the area could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals.

4.1.2. Impacts to Marine Mammals

We expect that behavioral disturbance and injury may result from exposure to underwater sound associated with the activities associated with the project. This is the only likely source of impacts to marine mammals. It is likely that the onset of pile driving could result in permanent threshold shift (PTS) in a limited number of animals. Pile driving may also result in temporary, short term changes in an animal's typical behavior and/or avoidance of the affected area. These behavioral changes may include changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haul-outs or rookeries).

We expect that the proposed activities would result, at worst, in injury to a limited number of animals (Level A harassment) as well as a temporary modification in behavior and/or temporary changes in animal distribution (Level B harassment) of certain species or stocks of marine mammals. We expect these impacts to be minor because we do not anticipate measurable changes to the population or impacts to rookeries, mating grounds, and other areas of similar significance. Furthermore, pile driving and removal at the project site will not obstruct movements or migration of marine mammals.

Under the Preferred Alternative, we would authorize incidental take, by Level B harassment, of seven species of marine mammals. NMFS would also authorize Level A take of three species of marine mammals. We expect no long-term or substantial adverse effects on marine mammals, their habitats, or their role in the environment. We base our conclusion on the results of previous monitoring reports for the same activities and anecdotal observations for the same activities conducted in the proposed research area.

ADOT&PF proposed a number of monitoring and mitigation measures for marine mammals as part of our evaluation for the Preferred Alternative. In analyzing the effects of the Preferred Alternative, we conclude that the monitoring and mitigation measures described in Section 2.3.1 would minimize and/or avoid impacts to marine mammals.

Injury: NMFS has authorized take of marine mammals by injury (Level A harassment), serious injury, or mortality. Three species of marine mammals may experience permanent threshold shift (PTS). However, based on the results of our analyses, ADOT&PF's environmental analyses, and anecdotal observations for the same activities with similar mitigation and monitoring requirements, even though PTS may occur in a small number of animals, there is no evidence that ADOT&PF's activities could result in serious injury, or mortality within the action area. The required mitigation and monitoring measures would minimize any the possibility of serious injury or lethal takes.

Vessel Strikes: The potential for striking marine mammals is a concern with vessel traffic. Studies have associated ship speed with the probability of a ship strike resulting in an injury or mortality of an animal. However, it is highly unlikely that the use of slow-moving boats and barges would result in injury, serious injury, or mortality to any marine mammal. Furthermore, a shutdown zone will be established that will halt operations whenever a marine mammal comes within 10 m of any vessels associated with pile-driving operations.

4.1.3. Estimated Take of Marine Mammals by Level A and Level B Incidental Harassment

ADOT&PF has requested take by harassment as a result of the acoustic stimuli generated by their proposed pile driving activities. We expect pile driving would cause PTS in a small number of animals and short-term behavioral disturbance for marine mammals in the proposed areas.

As mentioned previously, we estimate that the proposed activities could potentially affect three species of marine mammal by Level A harassment and seven species by Level B harassment.

Steller Sea Lion

There are numerous Steller sea lion haulouts in Icy Strait but none occurring in Icy Passage (Mathews *et al.*, 2011; Tod Sebens, CSE, Stephen Vanderhoff, SWE, Janet Neilson, NPS, personal communication). The nearest Steller sea lion haulout sites are located on Black Rock on the south side of Pleasant Island and Point Carolus west across the strait from Point Gustavus (Mathews *et al.*, 2011). Both haulouts are over 16 km from the Gustavus ferry terminal.

Steller sea lions are common in the ferry terminal area during the charter fishing season (May to September) and are known to haul out on the public dock (Tod Sebens, CSE, Stephen Vanderhoff, SWE, Janet Neilson, NPS, personal communication Bruce Kruger, ADF&G, personal communication). During the charter fishing season, Steller sea lions begin arriving at the ferry terminal as early as 2:00 p.m. local time, reaching maximum abundance when the charter boats return at approximately 5:00 p.m. local time. The sea lions forage on the carcasses of the sport fish catch and then vacate the area.

There are no density estimates of Steller sea lions available in the action area. The best available information on the distribution of these marine mammals in the study area comes from a recent on-site monitoring project, and monitoring efforts at nearby Icy Strait during a construction project in 2015.

ADOT&PF hired two observers to visit the Gustavus dock twice every day between March 7, 2016 and May 15, 2016. They scanned for marine mammals within 2000 meters for at least 30 minutes on each visit and recorded observations. Because these data are at the project location at the same time of year as the Spring phase of work for this project, and in the absence of survey data, NMFS considers these data best available for March through May.

Unfortunately, similar data are not available for the September through November work phase, anticipated in 2017. However, a nearby construction project in Icy Strait had marine mammal observers monitoring large zones during this period in 2015 southwest of the project area. Though Icy Passage and Icy Strait are different locations, they share similar timing of Steller sea lion's use of prey resources. There are nearby late summer/fall salmon runs near Icy Passage similar to those that likely drove the peak Sept/Oct Steller sea lion observations in the Icy Strait monitoring results (BerberABAM 2016). Because these data were collected near the project location at the same time of year as one of the work phases for this project, and in the absence of survey data, NMFS considers these data best available for September through November.

These sightings are the best available information regarding the presence of Steller sea lions in the action area during the months when the project will occur. Opportunistic sightings are not considered abundance estimates and do not account for unseen animals in the area and in the water. Opportunistic

surveys do not have a correction factor for those uncounted animals. However, in the absence of density estimates, NMFS used this data to estimate the numbers of individuals that may be exposed to noise from pile driving. NMFS considers these estimates to be conservative for the following reasons:

- The application states that between 16 and 50 days of pile driving activity will occur. NMFS used 50 days of pile driving in this exposure analysis.
- ADOT&PF assumed that 33 days of pile driving will occur in March, April, October, and November (non-charter season) and that 17 days of pile driving will occur in May and September (charter season).
    - 33 days in 4 non-charter months = 8.25 days/month outside of the charter season; 17 days in 2 charter months = 8.5 days/month during the charter season
- NMFS used the highest number of observed animals on any one day of the month, multiplied by the maximum number of pile-driving days in that month to estimate the total number of exposed animals.
- Actual percentage of the western DPS versus the eastern DPS of Steller sea lions is unknown, so NMFS conservatively estimates that all individuals are from the endangered western DPS.

NMFS used the maximum number of observed Steller sea lions on a single day in each month, as the daily estimator for take in that month. This includes ADOT&PF observations in March – May and Icy Strait observations in Sept – November as shown in Table 4. (Note that NMFS used data from these two studies to calculate exposures for all of the marine mammal species for which Level A and Level B take are authorized, with the exception of Dall's porpoise.) Individuals taken would be expected to be a mix of solitary adult males and females. NMFS does not anticipate exposure of Steller sea lion pups, as there are no rookeries within the action area.

Based on the information presented in Table 4, NMFS has authorized 709 Level B harassment takes of Steller sea lions. No Level A takes are authorized since the shutdown zone for Steller sea lions (25 m) is larger than the PTS isopleth (20.6 m).

Table 4. Estimated Monthly Total Number of Steller Sea Lions Exposed to Continuous and Impact Sourced Sounds From Pile Driving.

Month/Year	Project Activity Occurring	Charter season	Number of Days of pile driving	Maximum Number of Animals Observed on a Single Day	Estimated Monthly Total Number of Exposed Animals
March 2018	Construction	No	8.25	4[2]	33
April 2018	Construction	No	8.25	7[2]	57.75
May 2018	Construction	Yes	8.5	6[2]	51
September 2018	Construction	Yes	8.5	26[1]	221
October 2018	Construction	No	8.25	33[1]	272.25
November 2018	Construction	No	8.25	9[2]	74.25
Total					709.25 **709** (rounded)

[1]These estimates come from observations made at the dock during March-May of 2016.
[2]These estimates are from monitoring in nearby Icy Strait in 2015.

Humpback Whale

NMFS used humpback whale data collected from the same two sources that were used to calculate Steller sea lion exposures. The methodology used to calculate Steller sea lion exposures was also used to estimate humpback whale exposures and is not repeated here. Based on the information presented in Table 5, NMFS has authorized 600 Level B harassment takes of humpback whales. No Level A takes are authorized since the shutdown zone for humpback whales (550 m) is larger than the PTS isopleth (527.5 m).

Table 5. Estimated Monthly Total Number of Humpback Whales Exposed to Continuous and Impact Sourced Sounds from Pile Driving.

Month/Year	Number of Days of pile driving	Maximum Number of Animals Observed on a Single Day	Estimated Monthly Total Number of Exposed Animals
March 2018	8.25	6[1]	49.5
April 2018	8.25	22[1]	181.5
May 2018	8.5	10[1]	85
September 2018	8.5	15[2]	127.5
October 2018	8.25	18[2]	148.5
November 2018	8.25	1[2]	8.25
Total			600.25 **600** (rounded)

[1]These estimates come from observations made at the dock during March-May of 2016.
[2]These estimates are from monitoring in nearby Icy Strait in 2015.

Harbor Seal

There are no documented haulout sites for harbor seals in the vicinity of the project. The nearest haulouts, rookeries, and pupping grounds occur in Glacier Bay over 20 miles from the ferry terminal. However, occasionally an individual will haul out on rocks on the north side of Pleasant Island (Stephen Vanderhoff, SWE, personal communication). A recent study of post-breeding harbor seal migrations from Glacier Bay demonstrates that some harbor seals traveled extensively beyond the boundaries of Glacier Bay during the post-breeding season (Womble and Gende 2013). Strong fidelity of individuals for haulout sites during the breeding season was documented in this study as well. Harbor seals are also documented in Icy Passage in the winter and early spring (Womble and Gende 2013). Using the same two data sources and methodology previously described, NMFS has authorized 675 total takes of harbor seals as shown in Table 6. Since the PTS isopleth (282.3 m) is greater than the shutdown zone (100 m), NMFS is authorizing Level A take using the following calculation:

Level A takes = (PTS isopleth – Shutdown zone)/Level B Isopleth (3,265 m) * Total Takes

Level B takes = Total Takes – Level A Takes

Using these calculations, NMFS is authorizing 38 Level A and 637 Level B harbor seal takes.

Table 6. Estimated Monthly Total Number of Harbor Seals Exposed to Continuous and Impact Sourced Sounds from Pile Driving.

Month/Year	Number of Days of pile driving	Maximum Number of Animals Observed on a Single Day	Estimated Monthly Total Number of Exposed Animals
March 2018	8.25	20[1]	165
April 2018	8.25	16[1]	132
May 2018	8.5	7[1]	59
September 2018	8.5	22[2]	187
October 2018	8.25	16[2]	132
November 2018	8.25	0[2]	0
Total			**675** 38 Level A 637 Level B

[1]These estimates come from observations made at the dock during March-May of 2016.
[2]These estimates are from monitoring in nearby Icy Strait in 2015.

Harbor Porpoise

Harbor porpoise are common in Icy Strait. Concentrations of harbor porpoise were consistently found in varying habitats surrounding Zarembo Island and Wrangell Island, and throughout the Glacier Bay and Icy Strait regions (Dahlheim *et al.,* 2009). These concentrations persisted throughout the three seasons sampled. Dahlheim (2015) indicated that 332 resident harbor porpoises occur in the Icy Strait area, though the population has been declining across Southeast Alaska since the early 1990's (Dahlheim *et al.,* 2012). During a 2014 survey, Barlow *et al.* (in press) observed 462 harbor porpoises in the Glacier Bay and Icy Strait area during a three-month summer survey period. It is estimated that harbor porpoise are observed on at least 75 percent of whale watch excursions (75 of 100 days) during the May through September months (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication).

Using the same two data sources and methodology previously described, NMFS has authorized 158 total takes of harbor porpoise as shown in Table 7. Since the PTS isopleth (628.3 m) is greater than the shutdown zone (100 m) NMFS is authorizing Level A take. Using the same calculation utilized to derive harbor seal Level A and Level B takes, NMFS is authorizing 26 Level A and 132 Level B harbor porpoise takes.

Table 7. Estimated Monthly Total Number of Harbor Porpoise Exposed to Continuous and Impact Sourced Sounds from Pile Driving.

Month/Year	Number of Days of pile driving	Maximum Number of Animals Observed on a Single Day	Estimated Monthly Total Number of Exposed Animals
March 2018	8.25	7[1]	57.75
April 2018	8.25	4[1]	33
May 2018	8.5	3[1]	25.5
September 2018	8.5	2[2]	17
October 2018	8.25	3[2]	24.75
November 2018	8.25	0[2]	0
Total			**158** 26 Level A 132 Level B

[1]These estimates come from observations made at the dock during March-May of 2016.
[2]These estimates are from monitoring in nearby Icy Strait in 2015.

Killer whale

Based on observations of local marine mammal specialists, the probability of killer whales occurring in Icy Passage is low. However, they do occur in Icy Strait and have been observed in Icy Passage. Since there is no density information available for killer whales in this area, NMFS used the same two data sources and methodology described previously to estimate killer whale exposures. NMFS has authorized 126 Level B harassment takes of killer whales as shown in Table 8. No Level A takes are authorized since the shutdown zone for killer whales (25 m) is larger than the PTS isopleth (18.8 m).

Table 8. Estimated Monthly Total Number of Killer Whales Exposed to Continuous and Impact Sourced Sounds from Pile Driving.

Month/Year	Number of Days of pile driving	Maximum Number of Animals Observed on a Single Day	Estimated Monthly Total Number of Exposed Animals
March 2018	8.25	0[1]	0
April 2018	8.25	7[1]	57.75
May 2018	8.5	0[1]	0
September 2018	8.5	8[2]	68
October 2018	8.25	0[2]	0
November 2018	8.25	0[2]	0
Total			125.75 **126** (rounded)

[1]These estimates come from observations made at the dock during March-May of 2016.
[2]These estimates are from monitoring in nearby Icy Strait in 2015.

Minke Whale

Based on observations of local marine mammal specialists, the probability of minke whales occurring in Icy Passage is low. However, they have been documented in Icy Strait and Icy Passage and could potentially transit through the disturbance zone. The survey conducted from September through November did not document any minke whales. However, results from the March through May time period showed a monthly high of one minke whale sighting per day in April and two minke whales per day in May. An assumption of 8.25 days of driving in April and 8.5 days in May results in 25 minke whale exposures. NMFS will also conservatively assume that two whales may be exposed per day of driving in March. Based on these assumptions NMFS is authorizing Level B harassment take of 42 minke whales as shown in Table 9. No Level A takes are authorized since the shutdown zone for minke whales (550 m) is larger than the PTS isopleth (527.5 m).

Table 9. Estimated Monthly Total Number of Minke Whales Exposed to Continuous and Impact Sourced Sounds from Pile Driving.

Month/Year	Number of Days of pile driving	Maximum Number of Animals Observed on a Single Day	Estimated Monthly Total Number of Exposed Animals
March 2018	8.25	2	16.5
April 2018	8.25	1[1]	8.25
May 2018	8.5	2[1]	17
September 2018	8.5	0[2]	0
October 2018	8.25	0[2]	0
November 2018	8.25	0[2]	0
Total			41.75 **42** (rounded)

[1]These estimates come from observations made at the dock during March-May of 2016.
[2]These estimates are from monitoring in nearby Icy Strait in 2015.

Dall's Porpoise

Dall's porpoise are documented in Icy Strait but not Icy Passage. Dahlheim *et al.,* (2009) found Dall's porpoise throughout Southeast Alaska, with concentrations of animals consistently found in Icy Strait, Lynn Canal, Stephens Passage, upper Chatham Strait, Frederick Sound, and Clarence Strait. It is estimated that there are anywhere from four to 12 sightings of Dall's porpoise in Icy Strait per season during the May through September whale watching charter months (Tod Sebens, CSE, Stephen Vanderhoff, SWE, personal communication). NPS documented seven sightings in Icy Strait since 1993 in September, October, November, April, and May. The mean group size of Dall's porpoise in Southeast Alaska is estimated at three individuals (Dahlheim *et al.,* 2009).

Based on observations of local marine mammal specialists, Dall's porpoise are uncommon in Icy Passage. The two studies documenting marine mammals during the March through May and September through November timeframes did not record any sightings of Dall's porpoise. However, they do occur in Icy Strait and could potentially transit through the disturbance zone that extends out to Icy Passage. For this analysis, we will assume a maximum number of 12 sightings per season between May and September, which equates to 2.4 sightings per month. Using this number, it is estimated that the following number of Dall's porpoise may be present in the disturbance zone:

- Underwater exposure estimate: 2.4 group sightings/month × 3 animals/group × 6 months of pile driving activity (March – May; September – November) = 43.2

Therefore, NMFS has authorized the take of 43 Dall's porpoise. Since the PTS isopleth (628.3 m) is greater than the shutdown zone (100 m) NMFS is authorizing Level A take. Using the same calculation utilized to derive harbor seal Level A and Level B takes, NMFS is authorizing 7 Level A and 36 Level B takes of Dall's porpoise.

Table 10. Estimated Number of Exposures and Percentage of Stocks That May Be Subject to Level A and Level B Harassment

Species	Proposed Authorized Takes	Stock(s) Abundance Estimate	Percentage of Total Stock
Steller Sea Lion	709	49,497 (western stock in AK) 60,131 (eastern stock)	1.43% 1.18%
Humpback whale	600	10,103 (Central North Pacific Stock) Unknown (Mexico DPS)	5.94% Unknown
Harbor Seal	675	7,210	9.36%
Harbor Porpoise	158	11,146	1.42%
Killer whale	126	261 (Northern resident) 587 (Gulf of Alaska transient) 243 (West Coast transient)	48.2% 21.4% 51.8%
Minke whale	42	Unknown	Unknown
Dall's Porpoise	43	Unknown	Unknown

4.2. Effects of Alternative 2- No Action Alternative

Under the No Action Alternative, we would not issue an Authorization to ADOT&PF. As a result, ADOT&PF would not receive an exemption from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

The impacts to elements of the human environment resulting from the No Action alternative – conducting pile driving as part of the Terminal Improvements Project in the absence of required protective measures for marine mammals under the MMPA – would be greater than those impacts resulting from Alternative 1, the Preferred Alternative.

4.2.1. Impacts to Marine Mammal Habitat

Under the No Action Alternative, the effects on the physical environment or on components of the biological environment that function as marine mammal habitat that would result from ADOT&PF's planned construction activities are similar to those described in Section 1.4.2. These impacts include sediment disturbance and a temporary increase in turbidity. Even without mitigation measures, however, impacts to marine mammal habitat (including prey species) would be minimal and temporary for the following reasons:

- The area of potential effect is limited in both space and time ; and
- There are no rookeries or major haul-out sites nearby or ocean bottom structures of significant biological importance to marine mammals that may be present in the ensonified area.

The most likely impact to marine mammal habitat would be minor impacts to the immediate substrate during installation of piles or temporary avoidance by prey species of the immediate area. This Alternative would result in similar effects on the physical environment and components of the biological environment that function as marine mammal habitat as Alternative 1.

4.2.2. Impacts to Marine Mammals

Under the No Action Alternative, ADOT&PF's planned construction activities could result in increased amounts of Level A and Level B harassment to marine mammals, although no takes by serious injury or mortality would be expected even in the absence of mitigation and monitoring measures. While it is difficult to provide an exact number of takes that might occur under the No Action Alternative, the numbers would be expected to be larger than those presented in Table 10 above because ADOT&PF would not be required to implement mitigation measures designed to warn marine mammals of the impending increased underwater sound levels, and additional species may be incidentally taken because ADOT&PF would not be required to shut down activity if any marine mammals occurred in the project vicinity.

If the activities proceeded without the protective measures and reporting requirements required by Alternative 1, the direct, indirect, and cumulative effects on the human or natural environment of not issuing the Authorization would include the following:

- Increases in the number of animals incurring PTS and behavioral responses, and potential takes of additional species, because of the lack of mitigation measures required in the Authorization. Thus, the incidental take of marine mammals would likely occur at higher levels than we have already identified and evaluated in our *Federal Register* notice on the proposed Authorization; and

- We would not be able to obtain the monitoring and reporting data needed to assess the anticipated impact of the activity upon the species or stock; and increased knowledge of the species as required under the MMPA.

4.3. Unavoidable Adverse Impacts

ADOT&PF's application, our notice of a proposed Authorization, and other environmental analyses identified previously summarize unavoidable adverse impacts to marine mammals or the populations to which they belong or on their habitats occurring in the proposed project area. We incorporate those documents by reference.

We acknowledge that the incidental take authorized would potentially result in unavoidable adverse impacts, including marine mammal behavioral responses and alterations in the distribution of local populations. However, we do not expect ADOT&PF's activities to have adverse consequences on the annual rates of recruitment or survival of marine mammal species or stocks in Southeast Alaska waters, and we do not expect the marine mammal populations in that area to experience reductions in

reproduction, numbers, or distribution that might appreciably reduce their likelihood of surviving and recovering in the wild. We expect that the numbers of individuals of all species taken by harassment would be small (relative to species or stock abundance), and that the proposed project and the take resulting from the proposed project activities would have a negligible impact on the affected species or stocks of marine mammals.

4.4. Cumulative Effects

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

This cumulative effects analysis focuses on activities that may temporally or geographically overlap with ADOT&PF's activities and would most likely impact the marine mammals present in the proposed areas. We consider the impact of ADOT&PF's presence and effects of conducting activities in the proposed action areas to be insignificant when compared to other human activities in the area.

Past, present, and reasonably foreseeable impacts to marine mammal populations include the following: climate change; coastal development; marine pollution; disease; increased vessel traffic; and marine mammal whale watching. These activities account for cumulative impacts to regional and worldwide populations of marine mammals, many of which are a small fraction of their former abundance. However, quantifying the biological costs for marine mammals within an ecological framework is a critical missing link to our assessment of cumulative impacts in the marine environment and assessing cumulative effects on marine mammals (Clark *et al*., 2009). Despite these regional and global anthropogenic and natural pressures, available trend information indicates that most local populations of marine mammals in the Pacific Ocean are stable or increasing (Carretta *et al*., 2013).

The proposed project would add another, albeit temporary, activity in the waters of Southeast Alaska. This activity would be limited to a small area in and around the Gustavus Ferry Terminal for a relatively short period of time. This section provides a brief summary of the human-related activities affecting the marine mammal species in the action area.

4.4.1. Climate Change

Global climate change could significantly affect the marine resources of Southeast Alaska region. Possible impacts include temperature and rainfall changes and potentially rising sea levels and changes to ocean conditions. These changes may affect the coastal marine ecosystem in the proposed action area by increasing the vertical stratification of the water column and changing the intensity and rhythms of coastal winds and upwelling. Such modifications could cause ecosystem regime shifts as the productivity of the regional ecosystem undergoes various changes related to nutrients input and coastal ocean process (USFWS, 2011).

The precise effects of global climate change on the action area, however, cannot be predicted at this time because the coastal marine ecosystem is highly variable in its spatial and temporal scales.

4.4.2. Coastal Development

Urban and coastal development encompasses housing, businesses, transportation infrastructure, streets and parking lots, domestic wastewater effluent, floating structures, and mixing zones. Coastal development is one of the highest sources of nonpoint source pollution in Southeastern Alaska (Baker *et al.*, 2011). Coastal development not only displaces organisms that once used a particular site but also indirectly affects a much broader area through non-point source and point source pollution. However, ADOT&PF's proposed project consists largely of improvements to an area that already supports a built environment. Therefore, the proposed ADOT&PF's project will have a very limited cumulative effect on coastal development in Southeast Alaska.

4.4.3. Marine Pollution

Marine mammals are exposed to contaminants via the food they consume, the water in which they swim, and the air they breathe. Point and non-point source pollutants from coastal runoff, offshore mineral and gravel mining, at-sea disposal of dredged materials and sewage effluent, marine debris, and organic compounds from aquaculture are all lasting threats to marine mammals in the project area. The long-term impacts of these pollutants, however, are difficult to measure.

The persistent organic pollutants (POPs) tend to bioaccumulate through the food chain; therefore, the chronic exposure of POPs in the environment is perhaps of the most concern to high trophic level predators such as harbor seals and Steller sea lions.

ADOT&PF's activities associated with the Ferry Terminal construction project are not expected to cause increased exposure of POPs or other pollutants to marine mammals in the project vicinity due to the small scale and localized nature of the activities.

4.4.4. Disease

Disease is common in many marine mammal populations and has been responsible for major die-offs worldwide, but such events are usually relatively short-lived. ADOT&PF's construction activities are not expected to affect the disease rate among marine mammals in the project vicinity.

4.4.5. Increased Vessel Traffic

The construction activities are designed to improve the vehicle transfer span and dock at the Terminal such that damage during heavy storms is prevented, and to improve the safety of vehicle and pedestrian transfer operations. It is not explicitly directed towards enhancing the Ferry Terminal's shipping capacity. As such, ship traffic should remain constant, underwater sound levels should remain stable and ship strikes should occur at the levels they have in the recent past.

4.4.6. Commercial and Private Marine Mammal Watching

Although marine mammal watching is considered by many to be a non-consumptive use of marine mammals with economic, recreational, educational and scientific benefits, it is not without potential negative impacts. One concern is that animals may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle *et al*., 1993; Laist *et al*., 2001; Jensen and Silber, 2004). Another concern is that preferred habitats may be abandoned if disturbance levels are too high. Several recent research efforts have monitored and evaluated the impacts of people closely approaching, swimming with, touching and feeding marine mammals and has suggested that marine mammals are at risk of being disturbed ("harassed"), displaced or injured by such close interactions. Researchers investigating the adverse impacts of marine mammal viewing activities have reported boat strikes, disturbance of vital behaviors and social groups, separation of mothers and young, abandonment of resting areas, and habituation to humans (Nowacek *et al*., 2001, Bejder *et al.*, 2006, Higham *et al.*, 2009).

While marine mammal watching operations do occur in the vicinity of the proposed project area, ADOT&PF's authorized pile driving activities are of short duration encompassing a relatively small area, Therefore, the cumulative adverse effects of the proposed action on the affected populations when added to the effects of marine mammal watching are not expected to be significant.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted
NMFS Alaska Region

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Chapter 6 Literature Cited

Alaska Department of Transportation & Public Facilities. 2016. Request for an Incidental Harassment Authorization Gustavus Ferry Terminal Improvements Gustavus, Alaska. April 15, 2016

Allen, B.M. and R.P. Angliss. 2013. Editors. Alaska marine mammal stock assessments, 2012. National Marine Fisheries Service.

Allen, B.M. and R.P. Angliss. 2014. Alaska marine mammal stock assessments, 2013. NOAA Technical Memorandum NMFS-AFSC-277, National Marine Fisheries Service: 304.

Allen, B.M. and R.P. Angliss, editors. 2015. Draft Alaska Marine Mammal Stock Assessments, 2014. NOAA National Marine Fisheries Service.

Baker, L, Koski, K., Albert, d., and Cohen, N. 2011. A conservation Action Plan for Estuarine Ecosystems in Southeast Alaska. The Nature Conservancy.

Bejder, L., Samuels, A.M.Y., Whitehead, H.A.L., Gales, N., Mann, J., Connor, R., Heithaus, M., Watson-Capps, J.A.N.A., Flaherty, C. and Kruetzen, M., 2006. Decline in relative abundance of bottlenose dolphins exposed to long-term disturbance. *Conservation Biology*, *20*(6), pp.1791-1798

Carretta, J.V., E. Oleson, D.W. Weller, A.R. Lang, K.A. Forney, J. Baker, et al. 2013. U.S. Pacific marine mammal stock assessments: 2013. NOAA Technical Memorandum NMFS- SWFSC-532, National Marine Fisheries Service: 414.

Carretta, J.V., E. Oleson, D.W. Weller, A.R. Lang, K.A. Forney, J. Baker, et al. 2014. U.S. Pacific marine mammal stock assessments: 2013. NOAA Technical Memorandum NMFS-SWFSC-532, National Marine Fisheries Service: 414.

Clark, C. W., Ellison, W. T., Southall, B. L., Hatch, L., Van Parijs, S. M., Frankel, A., & Ponirakis, D. 2009. Acoustic masking in marine ecosystems: intuitions, analysis, and implication. Marine Ecology Progress Series, 395, 201-222.

Dahlheim, M.E., A. Schulman-Janiger, N. Black, R. Ternullo, D. Ellifrit, and K.C. Balcomb. 2008. Eastern temperate North Pacific offshore killer whales (*Orcinus orca*): Occurrence, movements, and insights into feeding ecology. Marine Mammal Science **24** (3):719-729.

Dahlheim, M.D., J.M. Waite, and P.A. White. 2009. Cetaceans of Southeast Alaska: Distribution and Seasonal Occurrence. *Journal of Biogeography* 36.3 (2009): 410-426

Dahlheim, M. E. and P. A. White. 2010. Ecological aspects of transient killer whales (*Orcinus orca*) as predators in Southeastern Alaska. Wildlife Biology 16: 308-322.

Dahlheim, M.D., A.N. Zerbini, J.M. Waite, and A.S. Kennedy. 2015. Temporal changes in abundance of harbor porpoise (Phocoena phocoena) inhabiting the inland waters of Southeast Alaska. *Fishery Bulletin*, *113*(3), 242-256.

Gabriele, C., J. Neilson, and P. Vanselow. 2015. Glacier Bay and Icy Strait Humpback Whale Fact Sheet. Glacier Bay National Park, updated April 2015.

Gabriele, C.M. and T.M. Lewis. 2000. Summary of opportunistic marine mammal sightings in Glacier Bay and Icy Strait 1994–1999. Glacier Bay National Park and Preserve, Gustavus, AK.

Jensen, A., and G.K. Silber. 2004. Large Whale Ship Strike Database. NOAA Technical Memorandum NMFS-OPR-25. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, MD.

Hart-Crowser, Inc. 2015. Biological Assessment: Gustavus Ferry Terminal Improvements, Gustavus, Alaska. Prepared for the Federal Highway Adminstration Alaska Division and Alaska Department of Transportation and Public Facilities. State/Federal Project No. 68128/0003182. June 17, 2015.

Higham, J.E.S., L. Bejder, and D. Lusseau. 2009. An integrated and adaptive management model to address the long-term sustainability of tourist interactions with cetaceans. Environmental Conservation, 35 (4): 294-302.

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet and M. Podesta. 2001. Collisions between ships and whales. Marine Mammal Science 17(1):35-75.

Mathews EA, Womble JN, Pendleton GW, Jemison LA, Maniscalco JM, et al. (2011) Population growth and colonization of Steller sea lions in the Glacier Bay region of Southeastern Alaska, 1970s–2009. Mar Mamm Sci 27: 852–880. doi: 10.1111/j.1748-7692.2010.00455.x

Muto, M.M. and R.P. Angliss. 2015. Alaska Marine Mammal Stock Assessments, 2015. National Marine Fisheries Service, National Marine Mammal Laboratory, Alaska Fisheries Science Center, Seattle, Washington

Neilson, J.L., C.M. Gabriele, and P.B.S. Vanselow 2014. Results of Humpback Whale Monitoring in Glacier Bay and Adjacent Waters 2012: Annual Progress Report. Natural Resource Technical Report NPS/GLBA/NRTR—2013/796. NPS/GLBA/NRTR—2013/.

Neilson, J.L., C.M. Gabriele, and P.B.S. Vanselow 2015. Humpback Whale Monitoring in Glacier Bay and Adjacent Waters in 2014. Annual Progress Report. Natural Resource Technical Report NPS/GLBA/NRTR—2015/949. NPS/GLBA/NRTR—2013/.

Neilson et al. 2014 Humpback Whale Monitoring in Glacier Bay and Adjacent Waters 2014 Annual Progress Report. Natural Resource Report NPS/GLBA/NRR—2015/949, Affiliation: National Park Service

Nowacek, S. M., R. S. Wells and A. R. Solow. 2001. Short-term effects of boat traffic on bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, FL. Marine Mammal Science 17(4):673-688.

NRC (National Research Council). 2003. Ocean noise and marine mammals. National Academy of Sciences: 220.

Richardson, W.J., C.R. Greene, C.I. Malme, and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press, Inc., San Diego, California.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. Marine Mammal Science 9:309-315.

USFWS. 2011. Climate Change in the Pacific Northwest. Available at: www.fws.gov/pacific/Climatechange/changepnw.html (accessed August 14, 2014).

Wade, P.R., T.J. Quinn II, J. Barlow, C.S. Baker, A.M. Burdin, J. Calambokidis, P.J. Clapham, E.A. Falcone, J. Ford, C.M Gabriele, D.K. Mattila, L. Rojas-Bracho, J.M. Straley, B.L. Taylor, J. Urbán R. , D. Weller, B.H. Witteveen, and M.Yamaguchi. 2016 (In Press). Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas. International Whaling Commision SC/66b/IAxx.

Wolfe, R. J., J. Bryant, L. Hutchinson-Scarbrough, M. Kookesh, and L.A. Sill. 2013. The Subsistence Harvest of Harbor Seals and Sea Lions in Southeast Alaska in 2012. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 383, Anchorage.

Womble, J.N., M. Sigler and M F. Willson. 2009. Linking seasonal distribution patterns with prey availability in a central-place forager, the Steller sea lion. Journal of Biogeography (J. Biogeogr.) (2009) 36, 439–451.

Womble JN, Gende SM (2013) Post-Breeding Season Migrations of a Top Predator, the Harbor Seal (Phoca vitulina richardii), from a Marine Protected Area in Alaska. PLoS ONE 8(2): e55386. doi:10.1371/journal.pone.0055386